G.Bossis, J.Alves-Marins, P.Kuzhir, O.Volkova, A.Zubarev*
Functionalized microfibers for field responsive materials and biological applications"
CNRS, UMR7336, Laboratoire de Physique de la Matière Condensée, Université de Nice-Sophia Antipolis, 28 avenue Joseph Vallot, 06100 Nice, France
**Urals Federal University, Lenina Ave 51, 620083, Ekaterinburg, Russia*

Magnetorheological and electrorheological fluids are most often suspensions of spherical particles with typical sizes ranging from the nanometer to the micrometer. Due to the progress in mastering the synthesis of nanoparticles, different shapes like fibers, disks, or spindles and also core-shell nanoparticles can be obtained quite easily and provide some specific advantages compared to the spherical particles. The torque on anisotropic particles under the action of an electric or a magnetic field, combined with a shear flow, gives rise to a different rheology compared to suspensions of spherical particles and opens new fields of applications. We shall first discuss the case of the conventional rheological parameters like the yield stress and the shear modulus of suspensions of fiber-like particles and theYoung modulus of composites including oriented microfibers. Then we shall give some examples of the usefulness of magnetic nanofibers for some biological applications like the destruction of cancer cells by magnetolysis or hyperthermia.